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REMARKS

This is a full and timely response to the non-final Official Action mailed **June 2, 2006**. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

Claims 31-67 were withdrawn from consideration under a previous Restriction Requirement. To expedite prosecution of this application, claims 31-67 are cancelled herein. The withdrawn claims are cancelled without prejudice or disclaimer. Applicant reserves the right to file any number of continuation or divisional applications to the withdrawn claims or to any other subject matter described in the present application.

Additionally, new claims 68-80 have been added. Thus, claims 1-30 and 68-80 are currently pending for further action.

Objection to Title:

The recent Office Action objected to the title as not being clearly indicative of the invention claimed. Accordingly, the title has been amended herein per the suggestion of the Examiner in the recent Office Action. Following entry of this amendment, the objection to the title should be reconsidered and withdrawn.

Prior Art:

Claims 1-6, 9-12 and 15-29 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0036200 to Patel et al. ("Patel-1"). For at least the following reasons, this rejection is respectfully traversed.

Claim 1 recites:

> A method for solid free-form fabrication of a three-dimensional object, comprising:
> depositing a bulk amount of phase-change material in a defined region;
> *selectively ink-jetting an ultraviolet initiator onto a predetermined area* of said defined region, wherein said ultraviolet initiator defines a cross-sectional area of said three-dimensional object; and
> exposing said ultraviolet initiator to an ultraviolet light to facilitate cross-linking of said defined region.

(Emphasis added).

Applicant notes that claim 1 recites "selectively ink-jetting an ultraviolet initiator onto a predetermined area" that "defines a cross-sectional area of said three-dimensional object." Thus, the ultraviolet initiator is selectively jetted to a bulk of build material in a pattern that forms a cross-section of the object being formed.

In contrast, Patel-1 teaches "a process for forming a three-dimensional article in sequential cross-sectional layers in accordance with a model of the article, the process comprising the steps of: defining a layer of powder material; applying a liquid reagent to the powder layer in a pattern corresponding to the respective cross-sectional layer of the model; and repeating these steps to form successive layers; and in which the powder substantially comprises a first reactive component and the liquid includes a second active component, the second active component being capable of either reacting with the first reactive component or facilitating the first reactive component to react with itself. Thus, *the two reactive components react on contact to form a solid lamina in the required pattern and this is repeated to form a solid article.*" (Patel-1, paragraphs 0008-0009).

Consequently, Patel-1 teaches two reactive components that "react on contact." Patel-1 does not appear to teach or suggest the claimed selective ink-jetting of an ultra-violet initiator that is subsequently exposed to ultraviolet light to facilitate cross-linking of the phase-change build material. The Office Action rather unhelpfully cites the entire Patel-1

reference, specifying approximately 40 paragraphs, without any precise explanation as to how or where Patel-1 is being read as teaching the subject matter of claim 1. (Action of 6/2/06, p. 3). (*Ex parte Levy*, 17 U.S.P.Q.2d 1461 (BPAI 1990), "It is incumbent upon the Examiner to identify where in the reference each element may be found.").

Patel-1 does teach a UV cure epoxy "which itself cures into a mass, filling in any gaps." (Patel-1, paragraph 0038). However, Patel-1 does not appear to teach or suggest "selectively ink-jetting an ultraviolet initiator into a predetermined area" as part of a method of sold free-from fabrication of a three-dimensional object.

Claims 1-6, 9-12 and 15-29 were alternatively rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0145088 to Patel et al. ("Patel-2"). For at least the following reasons, this rejection is respectfully traversed.

Like Patel-1, Patel-2 teaches "the two reactive components [that] react on contact to form a cured lamina in the required pattern and this is repeated to form a cured article." (Patel-2, paragraph 0010). Consequently, Patel-2 does not appear to teach or suggest the claimed selective ink-jetting of an ultra-violet initiator. With regard to UV radiation, Patel-2 teaches that, "*[a]fter 3 dimensional construction*, the excess powder is removed, and the part is preferably further post-cured, either thermally or by using electromagnetic irradiation (eg. UV, visible, infra red, microwave etc)." (Patel-2, paragraph 0062) (emphasis added).

In the case of Patel-2, the Office Action refers generically to 62 paragraphs of Patel-2. Consequently, it is unclear how the Office reads Patel-2 as teachings the subject matter of claim 1. Patel-2 does not appear to teach or suggest "selectively ink-jetting an ultraviolet initiator into a predetermined area" as part of a method of sold free-from fabrication of a three-dimensional object.

Claims 1-6, 9-12 and 15-29 were also rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application Publication No. 2004/0207123 to Patel et al. ("Patel-3"). For at least the following reasons, this rejection is respectfully traversed.

Like Patel-1 and Patel-2, Patel-3 teaches "the two reactive components [that] react on contact to form a solid lamina in the required pattern and this is repeated to form a solid article." (Patel-3, paragraph 0010). Like Patel-2, Patel-3 teaches that "*[a]fter 3 dimensional construction*, the excess liquid is drained off, and the part is preferably post-cured, either thermally or by using electromagnetic irradiation (eg. UV, visible, infra red, microwave etc)." (Patel-3, paragraph 0041). Patel-3 does not appear to teach or suggest "selectively ink-jetting an ultraviolet initiator into a predetermined area" as part of a method of sold free-from fabrication of a three-dimensional object.

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. Consequently, for at least this reason, the rejections described above based variously on Patel-1, Patel-2 or Patel-3 (collectively "the Patel references") should be reconsidered and withdrawn.

Additionally, various dependent claims of the application recite further subject matter that is not taught or suggested by the applied prior art. Specific non-exclusive examples follow.

Claim 2 recites "wherein the depositing a bulk amount of phase-change material step is performed after the selectively ink-jetting an ultraviolet initiator step." Claim 26 recites similar subject matter. The Patel references clearly do not teach or suggest selectively jetting an ultraviolet initiator and *then* depositing a bulk amount of phase-change build material.

Claim 5 recites "wherein said ultraviolet initiator is controllably jetted into a non-solid phase-change material." The Patel references only teach a solid, powdered build material. The Patel references utterly fail to teach or suggest a "non-solid" phase-change material as recited in claim 5.

Claim 17 recites "wherein said phase-change material comprises one of a stearyl acrylate, a cyclohexane dimethanol dimethacrylate, a cyclohexane dimethanol diacrylate, or a tris (2- hydroxy ethyl) isocyanurate triacrylate." In contrast, the Patel references fail to teach or suggest these materials used as a phase-change build material.

Claim 20 recites "wherein said ultraviolet initiator comprises one of an aromatic ketone or a hydroxyl ketone." Claim 21 recites "wherein said ultraviolet initiator comprises one of a, benzyl dimethyl ketal, a benzoin n-butyl ether, a trimethyl benzophenone, a benzophenone, or an alpha hydroxy ketone." In contrast, the Patel references fail to teach or suggest these materials used as an ultraviolet initiator.

Thus, the Patel references fail to teach or suggest the subject matter of many of the dependent claims of the application. Moreover, the recent Office Action fails to indicate how or where the cited prior art teaches the subject matter of the claims noted immediately above. For at least these additional reasons, the rejection of these claims should be reconsidered and withdrawn.

Claims 7, 8, 13, 14 and 30 were rejected under 35 U.S.C. § 103(a) in view of any one of Patel-1, Patel-2 or Patel-3 taken alone. For at least the following reasons, this rejection is respectfully traversed.

According to the Action the limitations recited in these claims are not taught by the Patel references but "would have been obvious to one of ordinary skill in the art at the time the invention was made in view of any one of the Patel et al references principally in order to make a three-dimensional product having desired properties." (Action of 6/2/06, p. 5). This is insufficient to support a rejection under § 103(a).

Where the examiner relies on a single reference under § 103, it is insufficient to merely state that it would be obvious, or a mere matter of design choice, to modify the disclosure to include the features of the claimed invention. *In re Mills*, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990). "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. (emphasis added). Accord. M.P.E.P. § 706.02(j). Moreover, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1420 (Fed. Cir. 1990)." M.P.E.P. § 2143.01.

"The examiner may take official notice of facts outside of the record which are capable of instant and unquestionable demonstration as being "well-known" in the art. *In re Ahlert*, 424 F. 2d 1088, 165 USPQ 418, 420 (CCPA 1970). . . . If the applicant traverses such an assertion the examiner should cite a reference in support of his or her position." M.P.E.P § 2144.03.

Consequently, Applicant hereby requests that prior art actually teaching the subject matter of claims 7, 8, 13, 14 and 30 be cited or the rejection of these claims reconsidered and withdrawn.

Additionally, claim 30 recites "heating the solid phase change material to a liquid form either before or after the step of ink-jetting the ultraviolet initiator." Claim 7 recites "wherein said ultraviolet light is configured to re-liquefy a surface layer of said phase-change material." Claim 8 recites "wherein said ultraviolet light further comprises infrared radiation." Claim 14 recites "applying ultrasonic energy to said phase-change material; wherein said ultrasonic energy is configured to facilitate a mixing of said phase-change material and said ultraviolet initiator."

None of this subject matter is anywhere taught or suggested by the cited prior art references. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). Consequently, for at least this additional reason, the rejection of claims 7, 8, 13, 14 and 30 should be reconsidered and withdrawn.

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Conclusion:

The newly added claims are thought to be patentable over the prior art of record for at least the same reasons given above with respect to the original claims. Therefore, examination and allowance of the newly added claims is respectfully requested.

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: September 1, 2006

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